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COMPLETE SPECIFICATION.

Improvements in Syringes.

We, HERMANN HAUSSMANN, SOLA B. DUNN and JAMES C. M^cCOMB, all of 122 Randolph Street Chicago in the County of Cook, and State of Illinois, United States of America, Gentlemen do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and
5 by the following statement:—

This invention relates to hypodermic syringes.

In the said syringes as heretofore constructed the fluid containing tube is composed of glass or other frangible material, in connection with which a reciprocating piston is employed for filling the tube and discharging the fluid therefrom.

10 It is well known that syringes so constructed are easily injured by accidental contact with harder materials or on dropping to the floor or ground, and frequently by the changes in temperature. But another and more important objection to these syringes is the drying and consequent shrinking of the pistons from non-usage, which frequently necessitates the re-wrapping thereof before it will operate, thus occasioning
15 annoyance and delay which is sometimes dangerous, for instruments of this character are frequently employed, in emergencies where a moments delay would be fatal.

The prime object of this invention is to have a compressible elastic tube for containing the injecting fluid which may be discharged therefrom by compression, and
20 the tube refilled by the expansion thereof only, whereby all danger of the fracture of the tube is avoided, and the necessity for the employment of a piston dispensed with, and to provide suitable mechanism for compressing said tube.

Another object is to combine with such a tube a pressure roller for compressing the same which shall be operated in substantially the same manner as the ordinary
25 piston, that is by means of a piston rod, which may be, if desired, gauged so as to indicate the quantity of liquids injected.

Another object is to have the compressing roller mounted in a suitable carriage having a sliding connection with the frame of the syringe, whereby the piston rod will be relieved of objectionable twisting and friction in its bearing, and a uniform
30 pressure exerted on the tube throughout the length thereof, whereby a vacuum is at all times produced behind the compression roller, and the tube rendered easier to fill and capable of operating to its full capacity.

We attain these objects by the devices illustrated in the accompanying drawing, in which:—

35 Figure 1 represents an enlarged plan view of a syringe embodying our invention.

Figure 2, a side elevation thereof.

Figure 3 a transverse vertical section on the line 3, 3 of Figure 2, and,

Figure 4 a central longitudinal section.

Similar letters of reference indicate the same parts in the several figures of the
40 drawing.

Referring by letter to the accompanying drawing A indicates a metallic frame piece or base plate, the ends B B¹ of which are upturned at a right angle and between which extends a compressible tube C, rigidly secured to the frame plate at the rear thereof by means of a clamping plate D between which and the frame plate, the end
45 of the tube is compressed and firmly clamped, and the said plate rigidly secured in position by a screw E working loosely through the base plate and tube, and engaging the clamping plate about the centre thereof, it being immaterial, however, whether one or more screws are employed.

Such a connection also serves to seal the rear end of the tube against the possible
50 escape therethrough of the fluid contained in the tube.

[Price 8d.]

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The forward end of the tube is secured in any convenient and well known manner to a nipple F the screw threaded neck of which works through the forward upturned end B of the frame plate, and projects a sufficient distance beyond said plate to have screwed thereon the usual hollow needle G for insertion in the flesh.

This nipple is also provided with a central bore H, which serves as a communicating passage between the tube and needle, the forward end of the tube being sleeved upon the nipple so as to be at all times expanded to permit the free escape of the liquid contained therein.

Through the rear upturned end B¹, of the frame plate, and above the clamping plate which secures the rear end of the tube to the frame plate, loosely works a piston rod I, graduated if desired, the forward end of which connects with a carriage J, consisting of angular metallic frame encompassing the tube and frame plate, the ends K, of which are turned under, as more clearly shown in Figure 3, so as to slide on the upper side of the frame plate, and thus guide the carriage in its reciprocations.

In this carriage is mounted a roller L, journalled at such a height above the base or frame plate that the contacting surface thereof will be removed from the surface of the frame plate a little less than the thickness of the two walls of the tube when brought together thereby, so as to tightly compress the tube between the said roller and the base plate, the ends K, of the carriage also serving to maintain the roller in this position at all times.

Thus it will be seen that as the carriage moves forward; the roller will travel along upon the tube, compressing the same as it moves forward, and expelling the fluid from the instrument during every part of its movement, the compressing force exerted upon the tube, being sufficient to prevent the possibility of air being drawn into the tube, in which there is always a vacuum behind the roller, and as the roller is drawn back to its former position at the rear end of the tube, the elasticity of the tube will cause it to draw a new supply of liquid, which may be discharged as before, and in substantially the same manner as if a piston were used in connection therewith.

The connection between the carriage and the piston rod, as well as between the needle and the nipple, is screw threaded, in order that the nipple and the rod may be removed for greater convenience in transportation:

To the rear angled portion B¹ of the frame, is also attached the finger pieces N, for convenience of manipulation, as is usual in such devices, the instrument in operation, being held so that the fingers engage said pieces, while the head of the piston rod bears against the palm of the hand.

In practice we propose to have the tube composed of rubber and covered with an envelope or wrapping of linen, silk, or other fabric, which will prevent both a stretching or elongation of the tube and the expansion or bulging thereof, beyond its normal size, when compressing the fluid contained therein; but our invention is not limited to this particular construction of tubing, for any other material possessing sufficient elasticity and flexibility to expand to its normal size after being compressed, may be employed instead and the same end be attained.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed we wish it understood that we claim:—

First. In a syringe, an elastic compressible tube for containing the injecting fluid, in combination with mechanism for compressing said tube, substantially as described.

Second. In a syringe, a compressible tube for containing the fluid, in combination with a reciprocating roller for compressing said tube, substantially as described.

Third. In a syringe, a compressible tube for containing the fluid, in combination with a reciprocating carriage, a roller mounted thereon and compressing said tube, and a piston rod for reciprocating said carriage, substantially as described.

Fourth. In a syringe, the frame plate provided with the upturned ends, a compressible tube rigidly secured at one end to said plate, a nipple working through one end of said frame upon which the opposite end of said tube is sleeved, the angular

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carriage, a sliding connection between said carriage and frame, a roller located in said carriage for compressing said tube, and a piston rod working loosely through the other upturned end of said frame, and secured to said carriage, substantially as described.

- 5 Fifth. In a syringe, a compressible tube for containing the liquid, composed of elastic material, and having a wrapping or covering of textile fabric, in combination with a reciprocating roller for compressing said tube, substantially as described.

Dated this 23rd day of April 1889.

10 HASELTINE, LAKE & Co.,
45, Southampton Buildings, London, Agents for the Applicants.

London : Printed for Her Majesty's Stationery Office, by Darling & Son, Ltd.—1889.



[This Drawing is a reproduction of the Original on a reduced scale]



